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Local Universe with Cosmicflows-4

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The large-scale structures in our local Universe emerge from the rivalry between gravitation and the expansion of the Universe, akin to a cosmic tug-of-war. Peculiar velocities of galaxies reflect their motion primarily governed by gravitational interactions, making them unbiased dynamical tracers of the total matter in the Universe (including dark and luminous matter). These velocities serve as crucial tools for testing the LCDM cosmological model. The Cosmicflows collaboration prepares catalogs of galaxy distances, enabling the derivation of radial peculiar velocities of galaxies. In this talk, I will demonstrate how deep learning techniques can reconstruct the local dark matter density and three-dimensional peculiar velocity fields from line-of-sight galaxy peculiar velocities.

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